STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Verso Androscoggin LLC	**Departmental**
Franklin County	**Findings of Fact and Order**
Jay, Maine	**New Source Review**
A-203-77-18-A	**NSR #18**

FINDINGS OF FACT

After review of the air emission license application, staff investigation reports, and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A., Section 344 and Section 590, the Department finds the following facts:

I. REGISTRATION

A. Introduction

FACILITY	Verso Androscoggin LLC
LICENSE TYPE	06-096 CMR 115, Minor Modification
NAICS CODES	322121
NATURE OF BUSINESS	Pulp & Paper Mill
FACILITY LOCATION	Riley Road, Jay, Maine

Verso Androscoggin LLC (Verso Androscoggin, the Mill) is an integrated pulp and paper manufacturing facility in Jay, Maine owned by Verso Paper Corporation. Operations at the Mill include a full range of manufacturing and supporting activities to produce a wide variety of pulp and paper products. The Androscoggin Mill produces both bleached Kraft pulp from a chemical pulping process and groundwood pulp from a mechanical pulping process.

The Androscoggin Mill is an existing stationary source currently operating under Part 70 License A-203-70-A-I and is considered a Part 70 major source, as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). The Mill has the potential to emit more than 100 tons per year (TPY) of particulate matter (PM), particulate matter under 10 micrometers (PM_{10}), particulate matter under 2.5 micrometers ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen oxides (NO_x), and carbon monoxide (CO); more than 50 TPY of volatile organic compounds (VOC); and more than 100,000 TPY of carbon dioxide equivalent (CO_2e); therefore, the source is a major source for criteria pollutants. Verso Androscoggin has the potential to emit more than 10 TPY of a single hazardous air pollutant (HAP) or more than 25 TPY of combined HAP; therefore, the source is a major source for HAP.

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B. New Source Review (NSR) License Description

Verso Androscoggin has submitted an application to license the use of natural gas as an alternative fuel in the No. 1 Recovery Boiler (RB1), the No. 2 Recovery Boiler (RB2), and the multi-fuel biomass boiler (also known as the Waste Fuel Incinerator, or WFI). Each of these three boilers is currently licensed to fire fuel oil as an auxiliary fuel, used mainly for boiler startups, for boiler stabilization purposes, and to stabilize and burn out black liquor beds in the recovery boilers. Natural gas is intended to displace a portion of the fuel oil used in each boiler, but fuel oil firing capability will be retained for operational flexibility.

C. Emission Equipment

The following equipment is addressed in this NSR air emission license:

Unit	Primary Fuel	Maximum Capacity firing Primary Fuel	Secondary Fuel(s)	Maximum Capacity firing Secondary Fuel(s)	Stack #
RB1	Black Liquor	2.5 MMlbs dry BLS[1]/day	fuel oil [2] natural gas	315 MMBtu/hour	RB1 & RB2 Stack
RB2		3.44 MMlbs dry BLS/day		405 MMBtu/hour	
WFI	Biomass	480 MMBtu/hour		240 MMBtu/hour	WFI Stack

[1] BLS ≡ black liquor solids

[2] including #6 fuel oil, specification waste oil, off-specification waste oil, and distillate fuel oil; with a maximum sulfur content of 0.5% by weight

Distillate fuel oil has historically been and continues to be used as a defoaming agent in black liquor. Distillate fuel oil use is monitored by tank level drop and prorated to the boilers based on black liquor firing records.

D. Application Classification

The application to add natural gas as a licensed auxiliary fuel for RB1, RB2, and the WFI does not violate any applicable federal or state requirements and does not reduce required monitoring, reporting, testing, or recordkeeping. This application includes a Best Available Control Technology (BACT) analysis performed per NSR requirements.

A modification is identified as major or minor based on whether or not the projected net emissions increase for any regulated pollutant exceeds the "Significant Emission Increase" level for that pollutant as specified in *Definitions Regulation*, 06-096 CMR 100 (as amended).

The net emissions increase for each regulated pollutant was determined by subtracting the annual baseline actual emissions, based on emissions of a 24-month period preceding the modification and which is representative of normal operation, from the annual projected actual emissions. According to 06-096 CMR 100 (15), to determine whether a net emissions increase has occurred, the representative 24-month period preceding the modification may be any 24 consecutive months within the 10 years prior to submittal of a complete license application, and the selected 24-month period can differ on a pollutant-by-pollutant basis. Verso Androscoggin has selected the following 24-month baseline periods to quantify baseline actual emissions, representative of typical Mill operations with stable operation of the three units over an extended time period.

Pollutants	24-Month Baseline Period
PM, PM_{10}, $PM_{2.5}$, SO_2, H_2SO_4, CO, VOC, Pb	January 2008 – December 2009
NO_x, CO_2e	April 2008 – March 2010

Baseline actual emissions presented in this NSR license are for auxiliary fuel use only in these three units. The baseline actual emissions for the project are based on records of auxiliary fuel use and AP-42 emission factors for filterable PM, filterable and condensable PM_{10} and $PM_{2.5}$, SO_2, CO, and VOC emissions from the auxiliary fuel(s), and licensed emission rates for PM and NO_x emissions.

Projected actual emissions firing natural gas as the auxiliary fuel were calculated using both vendor data and AP-42 emission factors. Emissions of PM, PM_{10}, $PM_{2.5}$, NO_x, CO, and VOC from firing natural gas were based on vendor-supplied values for the specific auxiliary fuel burners in each boiler. SO_2 emissions were based on AP-42 emission factors and the sulfur content of pipeline natural gas. Sulfuric acid mist (SAM) emissions were estimated as 5% of SO_2 emissions. Greenhouse gas emissions were estimated using 40 CFR Part 98 methodology and emission factors.

The data and results of this analysis of emissions from RB1, RB2, and the WFI are presented in the following table. The values in these tables are for the specified equipment and pollutants only; no other equipment at the facility is affected by this NSR license.

Pollutant	Baseline Actual Emissions (ton/year)	Projected Actual Emissions (ton/year)	Net Change (ton/year)	Significant Emissions Increase Threshold (ton/year)
PM	13.4	1.1	– 12.3	25
PM_{10}	9.1	1.1	– 8.0	15
$PM_{2.5}$	5.7	1.1	– 4.6	10
SO_2	92.3	0.1	– 92.2	40

Pollutant	Baseline Actual Emissions (ton/year)	Projected Actual Emissions (ton/year)	Net Change (ton/year)	Significant Emissions Increase Threshold (ton/year)
NO_x	49.4	22.2	– 27.2	40
CO	6.3	31.5	+ 25.2	100
VOC	1.6	0.8	– 0.8	40
Pb	0.07	0.0001	– 0.0699	0.6
H_2SO_4	4.6	0.0041	– 4.5959	7
CO_2e	31,735	16,441	– 15,294	75,000

Because the changes being made are not addressed or prohibited in the Part 70 air emission license and based on the above, this NSR license is determined to be a minor modification to the source under *Minor and Major Source Air Emission License Regulation* 06-096 CMR 115 (as amended). An application to incorporate the requirements of this NSR license into the Part 70 air emission license shall be submitted no later than 12 months from commencement of the requested operation.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license, the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in 06-096 CMR 100. BACT is a top-down approach to selecting air emission controls considering economic, environmental, and energy impacts.

B. Process Description

Before presenting a summary of applicable determinations and other standards and requirements that apply to this modification, a general process description of equipment relevant to this project is presented here.

Verso Androscoggin is an integrated pulp and paper manufacturing facility with equipment, operations, and supporting activities to produce bleached kraft pulp from a chemical pulping process and groundwood pulp from a mechanical pulping process. The pulp is used to make a wide variety of pulp and paper products. Bleached kraft pulp is produced in two separate lines, Pulp Mill A and

Pulp Mill B. Groundwood pulp is produced in a third process line, the Groundwood Mill.

The Groundwood Mill receives debarked logs from the Woodyard. The logs are fed to a set of grinders and mixed with water to form groundwood pulp slurry, which is discharged to the Grinder Flume. From there, the groundwood pulp is screened, refined, cleaned, sent to deckers for thickening, then bleached and sent on to the Paper Mill.

In the chemical pulping operations, screened wood chips from the wood processing area are sent to either Pulp Mill A or Pulp Mill B. The A line includes a continuous digester, brown stock washing/screening units, pulp storage tanks, process liquid storage tanks, and a pulp bleaching system (Bleach Plant A). The B line includes a continuous digester, diffusion washing units, screening units, pulp storage tanks, process liquid storage tanks, and a pulp bleaching system (Bleach Plant B). The wood chips are reacted with white liquor in the digesters on each line to form pulp, then washed and screened in brown stock washers. Subsequently, the pulp is chemically whitened in a series of reaction towers and washers that make up the bleach plants.

Pulp entering Bleach Plant A also passes through an oxygen delignification system that removes additional lignin. Both Bleach Plants A and B also receive pulp reclaimed from the Paper Mill. Chlorine Dioxide (ClO_2) used in the bleaching process is manufactured on site in a separate process system and can be directed to either bleach line. A dual scrubber system on each bleach line controls emissions from certain units in each bleach plant.

Pulp produced at the facility is either used in the Paper Mill Area or dried on the paper machines for storage and/or sale. Knots (uncooked wood chips removed from the pulp by the screening units) are either recycled back to the digesters, land-filled on-site, or sent off-site.

Filtrate from the brown stock washers or the diffusion washers, called "weak black liquor," is collected and sent to the recovery boiler process area. Weak black liquor received from the pulp mills is first passed through multiple-effect evaporators, where it is concentrated to a solids level that will support combustion. The concentrated black liquor is then sent to the recovery boilers, where it is reduced to form a smelt. The smelt flows from the bottom of each recovery boiler into smelt dissolving tanks, where it dissolves in process water, forming green liquor. Green liquor is reacted with lime (CaO) to make white liquor and lime mud ($CaCO_3$). White liquor is stored for subsequent use in the digesters, and lime mud is processed in Lime Kilns A and B to recover lime for reuse.

Supplemented with electricity purchased off the grid, Verso Androscoggin produces steam and electric power for mill operations with Recovery Boilers #1 and #2, Power Boilers #1 and #2, and the multi-fuel biomass boiler called the Waste Fuel Incinerator or WFI.

C. No. 1 Recovery Boiler (RB1) and No. 2 Recovery Boiler (RB2)

1. Background Information

RB1 was manufactured by Combustion Engineering in 1964 with a maximum process rate of 2.50 MMlbs dry black liquor solids (BLS) per day. It was installed at the facility in 1965 and converted to a low-odor design in 1985. The conversion of RB1 in 1985 did not result in an emission increase on a lb/hour basis, nor did the total cost of the project exceed 50% of the fixed capital projected cost for a comparable new recovery boiler.

RB2 was manufactured by Babcock & Wilcox in 1976 with a maximum process rate of 3.44 MMlbs dry BLS per day.

Both recovery boilers have undergone significant maintenance and upgrades since the early 1990s, including inclusion of a low sulfur fuel oil system, improvements in the operation and effectiveness of the control equipment, improvements in the air systems, replacement of parts of the furnace wall tubes, and other projects to maximize the efficiency of the two recovery boilers. These changes and improvements are addressed in several air emission license amendments found in the facility's files maintained by the Department.

RB1 and RB2 are licensed to fire black liquor and fuel oil, including #6 fuel oil, specification waste oil, off-specification waste oil, and distillate fuel oil. The fuel oil fired is allowed to contain a maximum sulfur content of 0.5% by weight and may be used as startup/supplemental fuel. RB1 has a maximum design auxiliary fuel heat input capacity of 315 MMBtu/hour; RB2 has a maximum design auxiliary fuel heat input capacity of 405 MMBtu/hour.

Flue gas emissions from RB1 and RB2 are controlled by the operation of an electrostatic precipitator (ESP). The ESP is a rigid frame, dry bottom design precipitator powered by transformer rectifier (TR) sets. The ESP has the design capacity to control emissions from both recovery boilers RB1 and RB2. Compliance with emission limits has been demonstrated while operating with one chamber of the ESP while the other chamber is down. Both recovery boilers exhaust through a common 240 foot above ground level (AGL) stack.

Emissions of total reduced sulfur compounds (TRS) from RB1 and RB2 are controlled in accordance with *Total Reduced Sulfur Control from Kraft Pulp Mills*, 06-096 CMR 124. Compliance with the TRS emission limit is demonstrated through the operation of a continuous emission monitoring system (CEMS) positioned downstream of the control devices to measure TRS concentration and percent O_2 in the emission stream.

Verso Androscoggin monitors black liquor solids, black liquor solids firing rate, and the fuel oil firing rate in RB1 and RB2 and will monitor the natural gas firing rate upon introduction of natural gas as an auxiliary fuel in the units. Continuous emission monitoring systems monitor SO_2, TRS, O_2, and NO_x in the individual boiler ducts, and a continuous opacity monitoring system is on the boilers' common stack.

2. New Source Performance Standards (NSPS), 40 CFR Part 60

<u>Subpart D</u>
RB1 and RB2 are not subject to 40 CFR Part 60, Subpart D – *Standards of Performance for Fossil-Fuel-Fired Steam Generators for Which Construction Is Commenced After August 17, 1971* because each unit's annual capacity factor firing oil is less than 10%.

<u>Subpart Da</u>
RB1 and RB2 are not electric utility steam generating units and therefore are not subject to 40 CFR Part 60, Subpart Da – *Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978.*

<u>Subpart Db</u>
Both RB1 and RB2 were installed prior to June 19, 1984, the applicability date for 40 CFR Part 60, Subpart Db, *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units.* Units modified or reconstructed after that date become subject to the requirements of this subpart.

Under NSPS 40 CFR Part 60.14, a modification is "any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies." This project consists of using natural gas to displace a portion of fuel oil fired in each of the units and will not enable the recovery boilers to fire above historic normal maximum operating levels. The project will involve neither a production increase nor an increase in emissions of PM, SO_2, NO_x, or TRS. Thus, the project does not constitute a modification to the units pursuant to 40 CFR Part 60.14.

Under NSPS 40 CFR Part 60.15, reconstruction means "the replacement of components of an existing facility to such an extent that the fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable entirely new facility." The estimated cost of the proposed project is approximately $2 million for each of the recovery boilers. The cost of entirely new recovery boilers to replace RB1and RB2 is estimated to be $130 and $150 million, respectively. Therefore, the natural gas project does not constitute reconstruction of either unit, as defined in 40 CFR Part 60.15.

The RB1 and RB2 natural gas project does not trigger Subpart Db requirements for these two units because it does not involve a modification and is not reconstruction of the units.

<u>*Subpart BB*</u>

Because the Mill's natural gas project does not constitute reconstruction of RB1 or RB2, these two units are not subject to 40 CFR Part 60, Subpart BB – *Standards of Performance for Kraft Pulp Mills.* [40 CFR Part 60, Subpart BB, § 60.280(b)]

3. National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 63

<u>*Subpart MM*</u>

RB1 and RB2 are subject to 40 CFR Part 63, Subpart MM – *National Emission Standards for Hazardous Air Pollutants for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills* and the applicable provisions contained in 40 CFR Part 63, Subpart A, *General Provisions*. Because RB1 and RB2 are not being reconstructed according to the definition relevant to Subpart MM applicability, RB1 and RB2 are not subject to the <u>new source</u> requirements of Subpart MM. RB1 and RB2 are already subject to the applicable requirements of Subpart MM for existing recovery boilers. The natural gas project will not change the applicable requirements under Subpart MM for RB1 or RB2.

Verso Androscoggin operates a continuous opacity monitoring system (COMS) on the recovery boilers' combined stack (RB1 & RB2 Stack). This COMS is required per the continuous monitoring system (CMS) requirements of 40 CFR Part 63, Subpart MM.

<u>*Subpart DDDDD*</u>

RB1 and RB2 are not subject to 40 CFR Part 63, Subpart DDDDD *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters* (Boiler MACT standards) because units covered by 40 CFR Part 63 Subpart MM are not subject to the Boiler MACT standards. [40 CFR Part 63, § 63.7491(f)]

4. Reasonably Available Control Technology (RACT)

<u>*VOC RACT*</u>
The chapter of Maine's rules entitled *Reasonably Available Control Technology for Facilities that Emit Volatile Organic Compounds (VOC-RACT)*, 06-096 CMR 134, exempts certain VOC-emitting equipment from the requirements contained therein. These listed exemptions include Kraft recovery boilers. The project to add natural gas as an auxiliary fuel to RB1 and RB2 will not trigger requirements of this rule. [06-096 CMR 134, Section 1(C)(5)]

<u>*NO_x RACT*</u>
Requirements of 06-096 CMR 138, *Reasonably Available Control Technology for Facilities that Emit Nitrogen Oxides (NO_x-RACT)*, for Kraft recovery boilers such as RB1 and RB2, include emission limits of 150 ppm @ 8% O_2 for RB1 and 206 ppm @ 8% O_2 for RB2. [06-096 CMR 138 (3)(I)] The NO_x RACT rule also requires that compliance be demonstrated on a 24-hour daily block arithmetic average basis through the use of a CEMS on the breaching of each recovery boiler before the common stack that satisfies the requirements of 06-096 CMR 117. [06-096 CMR 138 (3)(C)(2)] Verso Androscoggin shall continue to meet these NO_x RACT requirements for RB1 and RB2.

5. Best Available Control Technology (BACT)

The BACT analysis for firing natural gas as auxiliary fuel in the recovery boilers addresses only the replacement of some of the fuel oil fired as auxiliary fuel in the units with the firing of natural gas; no changes or modifications will be made to the black liquor firing systems in the boilers. The following is a summary of the BACT determination for RB1 and RB2 firing natural gas as auxiliary fuel, by pollutant.

a. Particulate Matter (PM, PM_{10}, $PM_{2.5}$)

An electrostatic precipitator (ESP) is employed on emissions from RB1 and RB2 with particulate control efficiency of 98% or greater. Particulate emissions from Verso Androscoggin's recovery boilers are currently limited to 0.035 gr/dscf at 8% O_2, which is below the MACT (Subpart MM) applicable emission standard for PM of 0.044 gr/dscf. According to the US EPA's RACT/BACT/LAER Clearinghouse (RBLC) database, the current PM emission limit and ESP control for RB1 and RB2 is within the range of the top PM emission reducing facilities.

Available PM control technologies include the use of clean auxiliary fuels; combustion optimization, tuning, and maintenance; and post-combustion controls. Natural gas is a clean fuel with low ash content. RB1 and RB2 have annual maintenance and combustion tuning performed for maximized combustion efficiency. The two recovery boilers are equipped with an ESP utilizing T/R voltage control software.

Verso Androscoggin has proposed and the Department has concurred that the use of natural gas, combustion optimization, tuning, and maintenance, and the emission limit of 0.035 gr/dscf constitute BACT for PM, PM_{10}, and $PM_{2.5}$ emissions from RB1 and RB2 firing natural gas as an auxiliary fuel.

b. Sulfur Dioxide (SO_2)

Sulfur dioxide is formed from the oxidation of sulfur in the fuel. Sulfur dioxide and sulfuric acid mist (SO_2 and H_2SO_4) emissions from firing natural gas in the recovery boilers are attributable to the presence of sulfur compounds in the natural gas. Available SO_2 control technologies include low sulfur content fuel, wet scrubbers, spray dry absorption, dry sorbent injection, and other sodium- and ammonia-based wet scrubbing technologies.

Verso has identified no dedicated, add-on flue gas desulfurization technologies in place on Kraft recovery furnaces in the pulp and paper industry. Based on review of EPA's RBLC database and NCASI data, no add-on controls for SO_2 control from recovery boilers firing natural gas were identified.

Natural gas is a fuel with low sulfur content. Clean fuel and good combustion practices are currently in use for the control of SO_2 from auxiliary fuel firing in RB1 and RB2; additional add-on control for SO_2 from firing natural gas is not economically feasible.

RB1 is currently limited to the following:

- 120 ppmdv SO_2 corrected to 8% O_2, on a 30-day rolling average basis, when RB1 is operating at a black liquor firing rate of 50% of capacity or higher;
- 140 ppmdv SO_2 corrected to 8% O_2, on a 30-day rolling average basis, when RB1 is operating at a black liquor firing rate of less than 50% of capacity.

RB2 is currently limited to the following:

- 150 ppmdv SO_2 corrected to 8% O_2, on a 30-day rolling average basis.

These limits were established for all potential firing scenarios for black liquor and fuel oil. Although natural gas innately has low sulfur content, to accommodate flexibility in auxiliary fuel firing, reduction of these limits is not justified as part of this modification. The Department finds that the use of natural gas, good combustion practices, and the existing SO_2 emission limits represents BACT for SO_2 emissions from RB1 and RB2 firing natural gas.

c. Nitrogen Oxides (NO_x)

Formation of nitrogen oxides occurs by three different mechanisms. The formation of thermal NO_x arises from the thermal dissociation and subsequent reaction of nitrogen (N_2) and oxygen (O_2) in the combustion air. Prompt NO_x is formed through the early reactions of nitrogen molecules in the combustion air with hydrocarbon radicals in the fuel. The third type is fuel-bound NO_x.

Available controls for emissions of nitrogen oxides from boilers include combustion modifications such as tuning, maintenance, combustion air design/modification (low-NO_x burners), flue gas recirculation, and oxygen trim plus water injection; and post-combustion controls, such as SNCR, SCR, and RSCR. Combustion optimization efforts can lead to reductions in NO_x emissions. RB1 and RB2 currently employ annual maintenance and combustion tuning for maximized combustion efficiency.

The primary purposes of firing auxiliary fuel in a recovery boiler are for boiler startup, to burn out the black liquor bed, and to fire the boiler during black liquor outages. Auxiliary burners must be designed to provide sufficient heat input to the lower section of the furnace to burn out the liquor bed. There is a tradeoff in the design of these auxiliary fuel burners between effective heat input and low NO_x emission design. Ultra-low NO_x emission burner design requires larger air delivery systems, which limits the size of the burner that can be installed within the existing recovery boiler's burner footprint and boiler port openings. Burners that achieve ultra-low NO_x emissions are too undersized for sufficient heat input into the lower furnace: If the burner size becomes too small, there would be no benefit to installing natural gas in the boilers. The burners selected for this project will be designed for sufficient heat input and NO_x emission rates not to exceed the existing limits for the oil fired auxiliary fuel process.

Flue gas recirculation, oxygen trim plus water injection, SNCR, SCR, and RSCR are controls that are technologically infeasible for Kraft recovery boilers. Because the primary purpose of a Kraft recovery boiler is to recover chemicals from spent pulping liquors in a safe and reliable manner, injection of additional substances or modification of the chemical recovery process to include such controls either cause unacceptably explosive conditions or have deleterious effects on the Kraft liquor recovery cycle on a long-term basis. Additional combustion modifications for further reduction of NO_x emissions are not technically feasible for the auxiliary fuel burner design and purpose.

The Department finds that BACT for NO_x emissions from the firing of natural gas as auxiliary fuel in RB1 and RB2 is the currently licensed emission rates of 150 ppm @ 8% O_2 for RB1 and 206 ppm @ 8% O_2 for RB2, on a 24-hour block average basis, the continued use of the NO_x CEMS, and annual tuning and maintenance.

d. Carbon Monoxide (CO)

Emissions of CO from Kraft recovery boilers result from incomplete or poor combustion. The RBLC database identifies good combustion practices and post-combustion controls as available CO control technologies.

Catalytic oxidation and thermal oxidation are post-combustion alternatives that have been used with gas turbines and internal combustion engines firing liquid or gaseous fuels that have relatively clean exhaust gases. This technology has not, however, been proven on a Kraft recovery boiler. Fouling of the catalyst would occur due to the heavy concentration of PM in the exhaust stream physically blocking the pores of the catalyst bed. While the combustion temperatures needed for catalytic oxidation are lower than the temperatures needed for thermal oxidation (due to the presence of the catalyst), the typical range of combustion temperatures is 700°F to 900°F. Thus, placing the catalyst bed after the ESP would require re-heating the flue gas to the required temperature range, an impractical option that would generate additional emissions of other criteria pollutants.

The Department finds that the employment of good combustion practices to meet the current CO emission limit of 266.6 lb/hour from both recovery boilers combined represents BACT for CO emissions from RB1 and RB2 firing natural gas as an auxiliary fuel.

e. Volatile Organic Compounds (VOC)

Emissions of VOCs from Kraft recovery boilers result from incomplete or poor combustion. The RBLC database identifies good combustion practices and post-combustion controls as available VOC control technologies.

Relevant add-on control options include carbon adsorption, absorbers (scrubbers), condensers, biofilters, and thermal oxidation. The selection of a particular control technology depends on stream-specific characteristics (flow rate, hydrocarbon concentration, temperature, moisture content, etc.) and the desired control efficiency. Add-on control technologies to reduce VOC emissions are not employed on kraft recovery boilers because the VOC content of the flue stream is too low for efficient and cost effective pollutant removal. A review of the RBLC database found no facilities utilizing add-on control technology as BACT for VOC emissions from a Kraft recovery boiler.

The Department finds that the employment of good combustion practices to meet the current VOC emission limit of 22.3 lb/hour from both recovery boilers combined represents BACT for VOC emissions from RB1 and RB2 firing natural gas as an auxiliary fuel.

f. Greenhouse Gases (GHG)

As defined in 06-096 CMR 100 (as amended), GHGs are a regulated pollutant, except that for the purposes of 06-096 CMR 115 and 06-096 CMR 140, the aggregate group of gases known as greenhouse gases are regulated pollutants only for the purposes of major New Source Review involving significant emissions of GHGs and Part 70 major source requirements. [06-096 CMR 100 (148)(H)] Thus, GHG are not subject to BACT requirements for the purposes of this project.

D. Multi-Fuel Biomass Boiler, a.k.a. Waste Fuel Incinerator (WFI)

1. Background Information

The multi-fuel biomass boiler, also called the Waste Fuel Incinerator or WFI, is licensed to fire biomass and oil. Biomass includes sludge, wood waste (including bark, knots and screenings, etc.), cotton residue, sawdust imbued with oil, and waste papers. Oil includes #2 and #6 fuel oil, specification used oil, off-specification used oil, and oily rags. All oil is limited to a maximum sulfur content of 1.8% by weight and is used as startup/supplemental fuel.

Emissions from the WFI are controlled by a variable throat venturi scrubber and demister arrangement, installed with a water spray into the demister. The scrubber media pH is controlled by weak white liquor and/or a caustic solution, if required. The WFI is also equipped with a combustion system designed to ensure the optimal balance between control of NO_x and limitation of CO and VOC.

Verso Androscoggin monitors the fuel oil firing rate, biomass firing rate, scrubber media solids, scrubber pressure drop, scrubber fluid flow rate, scrubber fluid pressure, and total steam production for the WFI and will monitor natural gas firing rate. The facility operates SO_2, O_2, and NO_x CEMS to monitor WFI emissions. Emissions from the WFI exhaust through a 221-foot stack.

2. New Source Performance Standards (NSPS), 40 CFR Part 60

<u>*Subpart D*</u>
The WFI was installed in 1976, after the NSPS applicability date for 40 CFR Part 60, Subpart D – *Standards of Performance for Fossil-Fuel-Fired Steam Generators for Which Construction Is Commenced After August 17, 1971.* The WFI has federally enforceable limits that require the firing of oil or natural gas at a lower rate than the Subpart D applicability rate of 450 MMBtu/hour. Additionally, the fuel oil supply pipeline to the WFI is maintained as three-quarter inch pipe, and air flow to the oil burner wind box is restricted to the level required for safe, complete combustion of oil at the licensed rate. Thus, the WFI is not subject to the NSPS requirements of Subpart D.

<u>*Subpart Da*</u>
The WFI is not an electric utility steam generating unit and is therefore not subject to NSPS 40 CFR Part 60, Subpart Da – *Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978.*

<u>*Subpart Db*</u>
The WFI was installed prior to June 19, 1984, the applicability date for 40 CFR Part 60, Subpart Db, *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units.* Units modified or reconstructed after that date become subject to the requirements of this subpart.

This project consists of using natural gas to displace a portion of fuel oil fired in the WFI and will not enable the unit to fire above historic normal maximum operating levels. The project will involve neither a production increase nor an increase in emissions of any PM, SO_2, NO_x, or TRS. Thus, the project does not constitute a modification to the unit pursuant to 40 CFR Part 60.14.

The estimated cost of the proposed project is approximately $1 million for the WFI. The cost of an entirely new multi-fuel biomass boiler to replace the WFI is estimated to be $100 million. Therefore, the natural gas project does not constitute reconstruction of the WFI as defined in 40 CFR Part 60.15.

The WFI natural gas project does not trigger Subpart Db requirements for the unit because it does not involve a modification and is not reconstruction of the unit.

3. National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 63

   The WFI is subject to 40 CFR Part 63, Subpart DDDDD *National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters* (Boiler MACT standards). Because the Mill's natural gas project does not constitute reconstruction of the WFI, this unit is not subject to the <u>new source</u> standards of 40 CFR Part 63, Subpart DDDDD. The WFI is already subject to the applicable requirements of Subpart DDDDD for existing stoker biomass boilers. The natural gas project will not change the applicable requirements under Subpart DDDDD for the WFI.

4. Reasonably Available Control Technology (RACT)

   <u>*VOC RACT*</u>
   The chapter of Maine's rules entitled *Reasonably Available Control Technology for Facilities that Emit Volatile Organic Compounds (VOC-RACT)*, 06-096 CMR 134, exempts certain VOC-emitting equipment from the requirements contained therein. These listed exemptions include VOC-emitting equipment from which the VOCs emitted are from the incomplete combustion of any material, such the WFI. The project to add natural gas as an auxiliary fuel to the WFI will not trigger requirements of this rule. [06-096 CMR 134, Section 1(C)(4)]

   <u>*NO_x RACT*</u>
   Requirements of 06-096 MCR 138, *Reasonably Available Control Technology for Facilities that Emit Nitrogen Oxides (NO_x-RACT)*, for mid-size boilers (50 to 1500 MMBtu/hour) firing biomass and oil, such as the WFI, include the emission limit of 0.4 lb/MMBtu on a one-hour average basis. [06-096 CMR 138 (4)(3)] The NO_x RACT rule also requires that compliance be demonstrated on a 24-hour daily block arithmetic average basis through the

use of a CEMS that satisfies the requirements of 06-096 CMR 117. [06-096 CMR 138 (4)(6) and (8)] Verso Androscoggin shall continue to meet these NO_x RACT requirements for the WFI.

5. Best Available Control Technology (BACT)

The purpose of this project is to license natural gas as an alternative auxiliary fuel in the WFI. The BACT analysis provided focuses on BACT for natural gas firing in the boiler; no changes or modifications will be made to the biomass firing systems in the boiler. The following is a summary of the BACT determination for the WFI, by pollutant.

a. Particulate Matter (PM, PM_{10}, $PM_{2.5}$)

Available control strategies for particulate matter emissions from the WFI include the use of clean auxiliary fuels, tuning and maintenance, optimization of combustion air, and post-combustion controls such as the use of a mechanical collector, wet scrubber, ESP, and baghouse/fabric filters. Natural gas is a clean fuel with low ash content. The WFI undergoes annual maintenance and combustion tuning to maximize combustion efficiency. The WFI is also equipped with a wet scrubber. Because these strategies represent the best emissions controls for auxiliary fuel use, no further technology evaluation was conducted for the BACT analysis.

The Department finds that the use of natural gas, good combustion practices, and compliance with the current limits of 0.10 lb/MMBtu and 48 lb/hour represents BACT for PM, PM_{10}, and $PM_{2.5}$ emissions from the WFI firing natural gas as an auxiliary fuel.

b. Sulfur Dioxide (SO_2)

Sulfur dioxide is formed from the oxidation of sulfur in the fuel. SO_2 and H_2SO_4 emissions from firing natural gas in the WFI are attributable to the presence of sulfur compounds in the natural gas. Available SO_2 control technologies include low sulfur content fuel, wet scrubbers, spray dry absorption, dry sorbent injection, and other sodium- and ammonia-based wet scrubbing technologies.

Based on review of the RBLC database, Verso has identified no dedicated, add-on flue gas desulfurization technologies in place on multi-fuel biomass boilers solely firing natural gas. Wet scrubbers are employed on multi-fuel fired boilers.

Natural gas is a fuel with low sulfur content. Clean fuel and good combustion practices are currently in use for the control of SO_2 from auxiliary fuel firing in the WFI; additional add-on control for SO_2 from firing natural gas is not cost effective.

The Department finds that the use of natural gas as an auxiliary fuel, good combustion practices, and meeting the existing SO_2 emission limit of 0.80 lb/MMBtu represent BACT for SO_2 emissions from the WFI firing natural gas as an auxiliary fuel.

c. Nitrogen Oxides (NO_x)

The WFI is a spreader stoker design boiler. This boiler is often operated handling swing load, which makes add-on NO_x controls difficult to implement. Spreader stoker boilers inherently practice staged combustion, which lowers NO_x emissions. The WFI is equipped with overfire air, providing staged combustion in the boiler.

NO_x formed from the combustion of fuels is a combination of both thermal NO_x and fuel NO_x. During wood combustion, fuel NO_x is the dominant NO_x formation mechanism, which is most efficiently controlled by staged combustion.

Low-NO_x burners are a possible control technology for NO_x emissions. However, because the use of auxiliary fuel in the WFI is a very small percentage of the heat input into the unit, this option does not warrant further consideration due to the limited amount of NO_x control that would result.

Other control technologies determined to be technologically and/or economically infeasible for NO_x control from natural gas firing as an auxiliary fuel in the WFI include flue gas recirculation, oxygen trim plus water injection, SNCR, SCR, and RSCR.

The Department finds that good combustion controls including annual tuning and maintenance, the currently licensed NO_x limit of 0.4 lb/MMBtu on a 24-hour block average basis, and the continued use of a NO_x CEMS is BACT for NO_x emissions from the WFI firing natural gas as an auxiliary fuel.

d. Carbon Monoxide (CO)

Emissions of CO from biomass boilers result from incomplete or poor combustion. Available control strategies include good combustion practices, catalytic oxidation, and thermal oxidation. The add-on oxidation technologies are not practical considerations for the biomass boiler and would add to the complexity, costs, and emissions associated with the system due to catalyst fouling from particulate matter in the exhaust stream and the need for additional heat input to the exhaust stream for effective thermal oxidation control. For the WFI equipped with a wet scrubber, catalytic oxidation and thermal oxidation technologies are not technically or economically feasible options for firing natural gas as an auxiliary fuel.

Good combustion practices include operation of the burners at optimum combustion efficiency, thereby reducing products of incomplete combustion while assuring appropriate air levels to minimize the generation of other pollutants.

The Department finds that good combustion practices and the currently licensed CO emission limit of 1200 lb/hour represents BACT for CO emissions from the WFI firing natural gas as an auxiliary fuel.

e. Volatile Organic Compounds (VOC)

Emissions of VOC from biomass boilers result from incomplete or poor combustion. Available control strategies include good combustion practices, catalytic oxidation, and thermal oxidation. For the reasons specified in the CO BACT analysis above, the add-on oxidation technologies are not technically or economically feasible options for firing natural gas as an auxiliary fuel.

The Department finds that good combustion practices and the currently licensed VOC emission limit of 140 lb/hour represents BACT for VOC emissions from the WFI firing natural gas as an auxiliary fuel.

f. Greenhouse Gases (GHG)

As defined in 06-096 CMR 100 (as amended), GHGs are a regulated pollutant, except that for the purposes of 06-096 CMR 115 and 06-096 CMR 140, the aggregate group of gases known as greenhouse gases are regulated pollutants only for the purposes of major New Source Review involving significant emissions of GHGs and Part 70 major source requirements. [06-096 CMR 100 (148)(H)] Thus, GHG are not subject to BACT requirements for the purposes of this project.

E. Incorporation into the Part 70 Air Emission License

The requirements in this 06-096 CMR 115 New Source Review license shall apply to the facility upon license issuance. Per *Part 70 Air Emission License Regulations*, 06-096 CMR 140 (as amended), Section 1(C)(8), for a modification that has undergone NSR requirements or been processed through 06-096 CMR 115, the source must apply, within one year of commencing the proposed operations, for an amendment to the Part 70 license to include the NSR license requirements, as provided in 40 CFR Part 70.5.

III. AMBIENT AIR QUALITY ANALYSIS

Verso Androscoggin previously submitted an ambient air quality analysis (NO_2 modeling in association with air emission license A-203-77-13-A, dated January 19, 2012; SO_2, PM_{10}, and CO modeling in association with air emission license A-203-71-E-R, dated September 3, 1996) demonstrating that emissions from the facility, in conjunction with all other sources, do not violate ambient air quality standards. An additional ambient air quality analysis is not required for this minor modification.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-203-77-18-A pursuant to the preconstruction licensing requirements of 06-096 CMR 115 and subject to the specific conditions below.

Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

SPECIFIC CONDITIONS

(1) **#1 Recovery Boiler and #2 Recovery Boiler (RB1 and RB2)**

A. The recovery boilers RB1 and RB2 are licensed to fire black liquor; fuel oil with a maximum sulfur content of 0.5% by weight including #6 fuel oil, specification waste oil, off-specification waste oil, and distillate fuel oil; and natural gas. [06-096 CMR 115, BACT]

B. The quantities of fuel oil, natural gas, and black liquor fired in each recovery boiler shall be monitored by fuel flow meters, with the exception of distillate fuel oil, which shall be monitored by the distillate oil storage tank level and calculations prorating quantities used to the boilers based on black liquor firing records. [06-096 CMR 115, BACT]

(2) **Waste Fuel Incinerator (WFI)**

A. In addition to the fuels licensed for firing in the WFI in air emission license A-203-70-A-I (January 12, 2005), the WFI is licensed to fire natural gas up to 240 MMBtu/hour. [06-096 CMR Chapter 115, BACT]

B. In addition to the monitoring already required for the WFI, the natural gas flow rate shall be continuously monitored whenever natural gas is fired in this unit. [06-096 CMR Chapter 115, BACT]

(3) **Incorporation into the Part 70 License**

Verso Androscoggin shall submit an application to incorporate this NSR license into the Part 70 air emission license no later than 12 months from commencement of the requested operation, per 06-096 CMR 140, Section 1(C)(8). [06-096 CMR 115]

DONE AND DATED IN AUGUSTA, MAINE THIS 14th DAY OF February, 2013.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Marc Allen Robert Cone for
PATRICIA W. AHO, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: December 20, 2012
Date of application acceptance: December 21, 2012

Date filed with the Board of Environmental Protection:

This Order prepared by Jane Gilbert, Bureau of Air Quality.

Filed
FEB 15 2013
State of Maine
Board of Environmental Protection